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ABSTRACT

The purpose of this study was to explore whether "holistic" instruction is an effective way to improve student attitudes toward instruction. Study participants were students in two Mathematics 111 classes at Malcolm X College (Illinois), 27 in the experimental and 27 in the control group. The experimental group received holistic instruction, while controls were taught in the traditional manner. The holistic delivery system, designed in accordance with the literature on the subject, involved structuring student success by using the following: a detailed syllabus explaining what was expected and how grades were earned; a first week orientation during which no math was taught while the instructor got to know the students and explained the instructional methods; frequent, non-graded, formative quizzes to determine mastery of unit objectives; cards with assignments sent to students who missed a class; and weekly half-hour math workshops. During the middle of the semester, students responded to an attitude questionnaire. The mean responses showed that holistically taught students had significantly higher positive attitudes toward instruction than those receiving traditional instruction. (Author/TR)

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A COMPARISON OF TRADITIONAL AND HOLISTIC INSTRUCTIONAL METHODS IN DEVELOPING POSITIVE ATTITUDES TOWARD MATHEMATICS INSTRUCTION IN STUDENTS AT MALCOLM X COLLEGE

by

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ABSTRACT

It is felt that many students enrolling at Malcolm X College have negative attitudes toward mathematics instruction. The purpose of this study was to explore the possibility that holistic instruction may be an effective method to improve students' attitudes toward instruction. Two classes of Mathematics 111 students, 27 in the experimental group and 27 in the control group were used in this study. The experimental group was instructed using the holistic approach and the control group was taught in the traditional manner. During the mid-term week of an 18-week semester, a questionnaire was administered to the students in the control and experimental groups and the mean questionnaire scores were analyzed utilizing an independent Student t-test with $p=.05$. The null hypothesis tested was that students in Mathematics 111 instructed using the holistic approach would not have significantly higher positive attitudes toward instruction than the group taught in the traditional manner. Since the calculated t value, $t(52)=2.38$, $p=.05$, exceeded the table value of $t=1.675$, the null hypothesis was rejected. Students instructed using the holistic approach had significantly higher positive attitudes toward instruction than the group taught in the traditional manner. On the basis of the completed study it was recommended that (1) the findings be reviewed, discussed, and evaluated by the mathematics department to determine methods for improving the design of Mathematics 111; (2) the study should serve as a catalyst for

exploration into the possibility that holistic instruction may be a more effective method to teach mathematics.

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INTRODUCTION

A number of community college educators insisted that new instructional strategies are needed to improve the educational experiences of students. Roueche, Herrscher, and Baker (1976) are among these. They believed that the community college needs to modify their traditional instructional techniques to accommodate the low aptitude student. Herrscher (1973) reported that research indicated that the traditional lecture method tended to be ineffective with nontraditional students. Roueche and Pitman (1972) emphasized that the traditional lecture method of instruction has not met the needs of the community college student. Roueche et al. (1976) further contended that it was the responsibility of the instructor to critically evaluate his or her own instructional delivery system in order to promote competencies in all students despite their learning difficulties.

Based on the review of the literature and the fact that a number of students enroll at Malcolm X College with negative attitudes toward mathematics instruction, the purpose of this study was to answer the question: Will students in Mathematics 111 instructed using a holistic approach have a significantly higher positive attitude toward instruction than the group taught in the traditional manner?

To fulfill the purpose of this study, the null hypothesis tested was that students in Mathematics 111 instructed using

the holistic approach would not have significantly higher positive attitudes toward instruction than the group taught in the traditional manner. The alternative hypothesis was that students instructed using the holistic approach would have significantly higher attitudes toward instruction than the group taught in the traditional manner.

Since the assignment of subjects was done on a random basis, a post-test only group design was used because it provided suitable controls for all sources of internal validity (Tuckman, 1972, p. 107). Tuckman added that the appropriate technique for treating the data would be a comparison of the mean questionnaire scores of the control group and the mean scores of the experimental group. Based on Tuckman's recommendation, an independent Student t-test with $p=.05$ was used to test the hypothesis.

BACKGROUND AND SIGNIFICANCE

The practicum topic was chosen based on discussions with Dr. Donald Rippey, National Lecturer for the Societal Factor Module. He suggested that there was a need for programs and learning activities that structured student success.

From an institutional perspective, the topic was the initial response to a statement by the President of Malcolm X College. He pointed out that new instructional strategies were needed to improve the services provided for high risk students. In order to meet this need, a holistic instructional

delivery system was designed and implemented.

The initial step taken in designing the delivery system was to review the literature focusing on the improvement of community college instruction. Roueche and Snow (1977) reported that many instructors, counselors, and administrators recognize that effective educational experiences must move away from merely mechanical approaches to skill development and realize the importance of self-concept development in student learning. Roueche and Snow (1977, p. 129) added that "developmental programs must be holistic in design and implementation if the real student problems are to be addressed."

Alvord (1972, p. 38) concurred with Roueche and Snow and added that there is a need for classroom instruction that focused upon the specific affective goals directly tied to such factors as attitudes and interests. He inferred that classroom instruction which centered on content-related objectives cannot be expected to produce the desired goals and objectives merely as by-products of the cognitive-centered instruction. He suggested that innovative instructional techniques must be developed which centered on specific content-related goals as well as affective goals.

In response to the need for innovative instructional strategies, Roueche and Snow asserted explicitly that the teacher is the key to the design and implementation of an effective program for students. This viewpoint is supported by Bloom (1968), Moore (1976), Cross (1976), Gordon and

Wilkerson (1966), and Roueche and Kirk (1973). Roueche and Snow added that the teacher role was essential since the teacher made three crucial decisions.

First, the teacher decided what is to be learned. Roueche and Snow (1977) pointed out that content selection was a powerful incentive for student motivation and significant learning. They insisted that content must have perceived practical utility or it must be of interest to the student. Thus, if the learners understand that the content is useful or related to their own interests, they are more responsive in their attempts to learn the material.

The second decision was how the subject is to be taught. Roueche and Mink (1976) documented that an individual learner-oriented instructional system was the appropriate method for helping community college students with academic deficiencies and negative attitudes toward education.

Roueche and Snow (1977, p. 117) defined individual learner-oriented instruction as a method of learning that was geared to the present capabilities of each student. They added that "high-risks students are staying in school with high retention rates, good achievement, and most important, new perceptions that they can succeed in college and that they are OK as human beings," when taught using an individualized instruction system.

Individualized instruction was associated with Bloom's mastery learning concept. Utilizing Bloom's theory, the

criteria for determining performance must be clear and objective. Each student is evaluated against performance criteria, and individual performances are not compared. In other words, criterion performance, not time, was the most important factor (Roueche and Snow, 1977).

Roueche et al. (1976) mentioned that competency-based instruction (CBI) is based on Bloom's mastery learning concepts and the theories of Carroll. Bloom (1968) believed that given enough time and assistance, 95 per cent of our students can learn a subject at a high degree of mastery. The Carroll (1963, p. 729) model for learning involved five elements--three stemmed from within the individual and two originated from external factors. Carroll stated:

> The factors in the individual are (1) aptitude--the amount of instruction needed to learn the task under optimal instructional conditions, (2) ability to understand instruction, and (3) perseverance--the amount of time the learner is willing to engage actively in learning. Factors in external conditions are (4) opportunity--time allowed for learning, and (5) quality of instruction--a measure of the degree to which instruction is presented so that it will not require additional time for mastery beyond that required in view of aptitude.

Roueche et al. (1976) added that CBI was designed to give students the kinds of skills, knowledge, and other abilities that were needed at some later time. Oriented toward success rather than failure, it guaranteed that most

of the students attained a specified level of skill. This level of skill concept was the major difference between CBI and the traditional method in that the former designed courses which were systematically linked together by a family of observable skills and created programs which were more specific and explicit. In this system, the competencies of students were agreed upon in advance, they provided a firm foundation for the next program of instruction or job performance, and the learning activities and related instructional strategies were designed to help the student acquire and demonstrate the desired outcomes.

In addition to deciding what was learned and how it was taught, Roueche and Snow reported that the third crucial decision that the teacher made was what the learning environment is to be. They were convinced that when teachers encourage cooperation and utilize positive reinforcement, they created an environment conducive to meeting the academic and personal growth needs of all students.

They recommended several ways in which teachers can create a learning environment. First, teachers must become involved with students. The initial step in becoming involved was knowing the name of every student by the end of the first week of school. Learning student's names communicates to them that the teacher is interested in them as human beings. In fact, Roueche (1976) felt that in order to get students to cooperate and become involved in the learning process

they must believe that they are OK as human beings. Also Roueche and Mink (1976) reported that there were significant relationships between the time that teachers were willing to spend early in the semester in getting involved with students and the amount of content these students mastered in the semester.

In addition to student involvement, teachers must communicate expectations daily by classroom behavior. Daily expectations are communicated by (1) trying to involve all students in discussions--not just bright ones; or (2) by teachers not avoiding direct contact with certain students (Roueche and Snow, 1977).

A third way in which teachers can create the proper learning environment was by caring. Roueche and Snow (1977, p. 121) defined caring as the "daily behavior that communicates to students how the teacher really feels about them." Roueche and Snow (1977, p. 119) noted that teachers willing to develop materials, specify objectives, and accommodate individual differences were indicating to their students that they care about them to the extent that they were willing to make extra efforts to ensure that they succeed. Cross (1976) added that the humanists such as Carl Rogers, Stanley Hall, and Abraham Maslow supported the development of a total campus environment that was accepting, loving, and caring in order to facilitate student learning.

Another way for teachers to show that they care was by monitoring student achievement daily. Roueche (1976) proposed that daily monitoring was one way of finding out when students were confused, and being able to help them at the moment of confusion was the best method for eliminating the problem.

Roueche and Roueche (1977, p. 40) concurred and emphasized that students must feel that the learning environment was designed for their success. They added that students must expect the following things to occur:

1. They must feel that the instructor is in their corner.
2. They must feel that the person in charge of the classroom activity and the dispensing of skill information is one whose primary job is to take whatever steps necessary to meet their present capabilities.
3. They should have as clear a picture of their task on a day-by-day, month-by-month basis as is possible.
4. They should be told and explained the relevancy of what they are doing.
5. They should be informed as to how they will be evaluated for their efforts.
6. Most importantly, they should be carefully guided in their day-by-day activities.

Several educators corroborated Roueche and Snow's (1977) and Roueche and Roueche's (1977) findings and added that the teachers expectations of the student's chances of success was probably the key factor in designing an environment conducive to learning. Bloom (1968), Bloom, Hastings and Madaus (1971), Rosenthal (1968), Rosenthal and Jacobson (1968), Roueche (1968), Roueche (1973) and Moore (1970) all agreed that the teacher's expectations may be the most important factor of student achievement in the classroom. They believed that students or less knowing individuals had a tendency to perform to the level expected of them by authority figures. In fact, Canfield (1968, p. 69) documented that 25 per cent of the students in any class and in any course would fail if the teacher thought that they were not capable of succeeding. Zigler (cited in Tavris, 1976, p. 74) added that "the commitment to do something makes the difference. Once a kid sees that you're doing something--and you feel like you are doing something--things happen. What will do kids in, is the attitude that nothing works."

To this point the need for instruction to focus on both cognitive and affective goals, ways in which teachers can create the proper learning environment, and the importance of teacher expectations has been considered. Next, Bloom's (1971) research as related to school learning and the affective consequences of mastery learning were considered.

Bloom reviewed a number of studies on interest, attitudes,

self-concept, and motivation as related to school learning. Based on this review, he contended that each student judged himself against the standards set by himself, the teacher, or peers. These judgements were made frequently since the school probably stressed competition as the primary technique for motivation. Only rarely were these school judgements based on absolute norms (Bloom, 1971, p. 15). Bormuth (1970) and Glaser and Nitko (1970) agreed that relative rather than absolute norms were the basis for most school judgements.

Bloom noted that a series of particular learning tasks helped students to secure many judgements of their capabilities to perform these tasks. With public appraisals of their performance, they began to see themselves as highly capable with this type of task, moderate in capability, or low in capability. Since they were given at least one year of a particular task, they were forced to accept some judgement concerning their capability to master this task.

As students' performances and perceptions of their ability to master these tasks accumulated and became more consistent, their motivations for the next tasks became stable. If they viewed their performances as adequate, they approached the next task with confidence and assurance. If their performance has not been adequate, the students began to believe in their inadequacy, and they found little energy to accomplish the next task, and little perseverance when they encountered difficulties (Atkinson and Feather, 1966).

Bloom (1971) took the position that students' attitudes toward instruction was a perceptual phenomena based on the judgements they made on their adequacy to perform particular learning tasks. These perceptions had consequences for future efforts at learning. Success (adequacy) in the subject caused students to choose to learn more tasks of this type. Failure (inadequacy) in the subject caused students to avoid further learning tasks of this type.

Bloom, Hastings, and Madaus (1971, p. 56) and Wentling (1973, p. 57) confirmed Bloom's findings. Bloom et al. (1971) indicated that students' attitudes toward schooling affected their long-term learning. If students felt they were doing well in a subject, the subject was opened for further exploration. Conversely, to do poorly closed that area for further voluntary study.

Bloom (1971) also proposed that varying degrees of success (or failure) may be needed for different students to develop this positive (or negative) attitude toward instruction. However, he felt that this was only a matter of degree, and that students who accumulated sufficient experiences of success (or failure) would at some point develop positive (or negative) attitudes toward instruction.

In discussing attitudes, Bloom thought that the object of the effect was outside the individual. Students developed a positive attitude toward the school or subject. However, if the judgements of adequate or inadequate performance

in learning tasks was generalized over a large number of tasks over a number of years, the appraisals shifted from the subject or school to the individual.

Bloom does not believe that a few successful or unsuccessful experiences had a major effect on students self-concept. But, given a sufficient number of successful or unsuccessful experiences almost every student succumbed to a self-view which was positive (adequate) or negative (inadequate). It was the frequency and consistency of judgements of adequacy or inadequacy over a period of years which had the major effects on self-concept.

Block (1974, p. 50) concurred with Bloom's findings after reviewing a number of studies on the affective consequences of mastery learning. He found that almost all the data verified that the mastery approach to the teaching-learning process had noticeable effects on students' attitudes.

A number of studies further substantiated Block's findings. Bloom (1974), Block (1971), Sheppard and MacDermot (1976) and Roueche and Kirk (1973) emphasized that the mastery learning concept produced positive student attitudes toward instruction.

In summary, the practicum topic was chosen based on discussions with the national lecturer, the president of Malcolm X College, and a review of the literature. The literature indicated that (a) effective instructional pro-

grams must be holistic in design and implementation; (b) the teacher is the key in designing an effective delivery system; and (c) a student's attitude toward instruction was a perceptual phenomena that affected long-term learning.

PROCEDURES

The original study consisted of 70 students, but 6 were dropped because they did not pass an arithmetic performance test that was used to determine eligibility for registration in Mathematics 111, and 10 withdrew from the two sections. Thus, the final study consisted of 54 students enrolled in Mathematics 111 at Malcolm X College. They were randomly assigned to two out of a total of eight Mathematics 111 sections. The classes met at 9:00 a.m. and 10:00 a.m. on Monday, Wednesday, and Friday.

Kincaid's study (cited in Childers and Haas, 1970, p. 21) offered the precedent by which college and university registration was relied upon to ensure that subjects were assigned on a random basis. Registration was restricted to special days and students chose their own classes. Also, each student wrote an arithmetic performance test, in which an item analysis was done to ensure content validity, to determine if he or she should register for Mathematics 111 (Knowledgeable) or Mathematics 103 (less Knowledgeable). Since the college specifies a maximum of 35 students in 111 sections, no more

than this was assigned to any class. Balance in the number of students was sought, but no other attempts were made to distribute students by any other standard.

Subjects were taught by one instructor, used the same written instructional materials, and wrote the same examinations. The experimental group, utilizing the holistic instruction approach, contained 27 students and was chosen by a flip of a coin. The control group was taught using the traditional method and contained 27 students. During the mid-term week of an 18-week semester, a questionnaire (see Appendix) was administered to the students in the control and experimental groups and the mean questionnaire scores were computed and analyzed.

The questionnaire was a revised version of the Pennsylvania State University Attitude Inventory. The questionnaire included 43 out of the 47 items comprising the original attitude inventory. The original instrument was designed to assess student attitudes toward a specific period of instruction. The reliability of the Pennsylvania State University Attitude Inventory was .918 (Finch, 1969).

The questionnaire was constructed using a Likert scale. This scale was used for respondents to register the extent of agreement or disagreement with a particular statement of an attitude. The respondents registered their opinions by circling the letter(s): SA (strongly agree), A (agree), N (neutral), D (disagree), or SD (strongly disagree). The responses were scored using the following keys: SA=5, A=4,

N=3, D=2, SD=1 for items written in a positive direction and SD=5, D=4, N=3, A=2, SA=1 for items written in a negative direction (Finch, Note 1).

Since college and university registration guaranteed the unbiased assignment of subjects to conditions, the post-test only group design was used because it provided suitable controls for all sources of internal validity (Tuckman, 1972, p. 107). Tuckman added that the appropriate technique of analysis for treating the data was to compare the mean scores of the control group and the mean scores of the experimental group. Based on Tuckman's recommendation an independent Student t-test with $p=.05$ was used to determine if there was a significant difference between the mean questionnaire scores of the two groups.

The null hypothesis tested in this study was that students in Mathematics 111 instructed using the holistic approach would not have significantly higher positive attitudes toward instruction than the group taught in the traditional manner. The alternative hypothesis was that students instructed using the holistic approach would have significantly higher attitudes toward instruction than the group taught in the traditional manner.

Definition of Terms

Absolute grading system - A method of student evaluation based solely on an individual's performance in a given subject regardless of the achievements of others in the group.

Attitude - "A general disposition to regard something in a positive or negative way (Bloom, 1971, p. 20)."

Attitude toward instruction - An individual's general disposition to regard the instructor, the learning activities, and the subject matter in a positive or negative way. This variable was measured by a questionnaire (see Appendix).

Competency-based instruction - A teaching method that "requires students to demonstrate in the classroom the kinds of skills, knowledges, and other abilities required of them at some later time: in a later course, or on the job following graduation. Time is the variable and achievement is the constant (Roueche et al., 1976, p. 43)."

Formulative evaluation - "A method of identifying learning weaknesses before the completion of a lesson, unit, or objective (Block, 1971, p. 79)."

Holistic Instruction - A systematic teaching method that structured student success. The delivery system incorporated the concepts of competency-based instruction with the theories of the humanists who believe that learning should occur in a accepting, loving, and caring environment in which an individual can realize his or her full potential without threat or embarrassment.

Mathematics 103 - Freshmen algebra course that began with an introduction to arithmetic and developed algebraic concepts through systems of linear equations.

Mathematics 111 - Freshman algebra course that began with an introduction to sets and developed algebraic concepts through systems of linear equations.

Negative attitude toward instruction - A negative attitude toward instruction was a characteristic of a student who would not voluntarily engage in a learning task or series of learning tasks, if free to make such a choice. This variable was measured by a questionnaire.

Positive attitude toward instruction - A positive attitude toward instruction was a characteristic of a student who would voluntarily engage in a learning task or series of learning tasks, if free to make such a choice.

Recycling - A method used to inform the learner of any additional opportunities he or she had to achieve selected objectives in the event he or she does not achieve competency on the first post-assessment.

Traditional instruction - A teaching method that required students to operate within a specified time limit. The criteria of success was a letter grade which indicated the extent to which the student knew the required subject matter. It did not make provisions for students to achieve at their own rate.

Limitations of the Study

To assist the reader in interpreting the findings, the limitations of the study were:

1. Range of study was limited to one school, Malcolm X College, and two classes out of a total of eight Mathematics 111 sections.

2. One teacher taught both the experimental and control groups, which affected external validity (Tuckman, 1972, p. 97).

3. The study was conducted over nine weeks of an 18-week semester.

4. The questionnaire used in the study contained only 43 out of the 47 items listed on the Pennsylvania State University Attitude Inventory.

Basic Assumptions

For the purposes of this investigation, it was assumed that:

1. The Pennsylvania State University Attitude Inventory developed and evaluated by Finch (1969) was valid and reliable.

2. The data derived from the instrument was accurate.

3. The experimental and control groups were representative of the total population.

RESULTS

Two sections of Mathematics 111 students, 27 in the experimental group and 27 in the control group, were used in this study. The experimental group was instructed using the holistic instruction approach and the control group was taught in the traditional manner.

Since the calculated t-value, $t(52)=2.38$, $p=.05$, exceeded the table value of $t=1.675$, the null hypothesis was rejected (see Table 1). Students instructed using the holistic approach have significantly higher positive attitudes toward instruction than the group taught in the traditional manner.

TABLE 1

Comparison of Means of the Experimental and Control Groups

Group	N	$\bar{X}$	s	df	t
Experimental	27	179.89	22.10	52	2.38*
Control	27	160.07	37.22		

* $p=.05$

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The hypothesis of the study was supported. Students instructed using the holistic approach had a significantly higher positive attitude toward instruction than the group taught in the traditional manner. This hypothesis was formulated based on Bloom's (1971) findings that a student's attitude toward instruction was a perceptual phenomena based on the judgements made of their adequacy to perform a particular learning task or series of learning tasks. These judgements were based on the school they attended, the marking system, and the learning activities.

In designing a delivery system that would improve students' attitudes toward instruction by decreasing their feelings of inadequacy in mastering a series of learning tasks, the research of Roueche et al (1976) and Roueche and Snow (1977) was relied on. Roueche et al. (1976) pointed out that CBI encouraged feelings in students that success was possible given sufficient time and direction. Also, Roueche and Snow (1977 insisted that instructors must create an environment conducive to meeting the academic and personal growth needs of students.

Based on the writing of Roueche et al. (1976) and Roueche and Snow (1977), a holistic instructional delivery system was designed and implemented. This delivery system structured student success by utilizing the following

techniques:

1. Each student received a detailed syllabus that explained what was expected of them and how their grade would be earned.

2. The first week of class was orientation in which no content (mathematics) was taught. Instead, the instructor learned the name of every student and explained the method of instruction to be used. During this week and throughout the semester, students were consistently reminded that the instructor would do everything humanly possible to assist them in earning a grade of A.

3. Students were given frequent non-graded formative evaluation quizzes to determine if they had mastered the unit objectives. They received as many opportunities as needed to achieve competency on unit objectives. However, a student could not rewrite a quiz unless he first obtained tutorial assistance.

4. If a student missed a class, he or she was called or mailed a card that informed him or her of any assignment or information that was missed.

5. Each student was required to attend a weekly half-hour mathematics workshop consisting of five or six individuals.

In these workshops, the instructor, a paraprofessional, and tutors identified and assisted students in achieving competency in any objectives or units not mastered. All the tutors were former students of the instructor and were paid through a federally assisted work-study program. This procedure was effective because it ensured that the tutor understood the instructor's methodology. Also, the instructor knew the tutor's capabilities and a warm, trusting and loyal relationship was developed between the instructor, tutors, and paraprofessional. It should be noted here that the paraprofessional was a member of the Learning Resource Centers staff.

In addition to the weekly workshop, the tutors were available in a designated room at particular hours to provide tutorial assistance. Students from both the control and experimental group were allowed to use this service. However, only the experimental group consistently participated in these additional sections. This was probably because trusting relationships between the tutors and students in the experimental group were developed in the mathematics workshop. Also, the students in the experimental group were personally sent or walked to a particular tutor when they needed additional assistance, whereas, the individuals in the control group were repeatedly told that the service was available and it was their responsibility to seek out the tutor.

6. All initial unit examinations were worth 120 points. If a student did not pass a unit examination, he or she was given an opportunity to recycle any problems not mastered on that test. However, a unit examination that must be recycled, or that was not written on the announced day it was given, was only worth 80 points. This policy was adopted to provide incentive for students to recycle examinations and curtail student procrastination.

7. All lectures were recorded on a video-cassette. This technique was employed to allow students to review any lesson they missed or did not thoroughly understand.

8. A folder containing the results of the non-graded formative evaluation quizzes and unit tests was maintained for each student. These records were kept to assist the instructor in counseling and monitoring students' progress on a daily and weekly basis.

The results of this study and the techniques utilized in the holistic instructional delivery system have several implications for Malcolm X College in particular and community college educational practices in general. The first implication was that students can learn and develop positive attitudes toward their educational experiences when taught by an instructor who is willing to develop materials and meaningful learning

activities, and create the proper learning environment. The second implication was that holistic instruction by creating a success rather than failure expectancy may help students to begin to believe that they are gifted individuals with untapped talents that can assist them in leading much fuller lives than they are currently experiencing. The final implication was that by structuring student success instructors may be able to relieve students anxieties concerning their ability to master unpopular courses such as mathematics.

The results of this study also suggested a need for further research in holistic instruction. One avenue of research would be longitudinal studies in which data would be collected over a number of years. Another would be to investigate if holistic instruction can be implemented with one instructor teaching four classes. A third possibility would be to determine the effectiveness of holistic instruction in increasing student achievement and retention.

On the basis of the completed study and the findings of Roueche et al. (1976), Roueche (1976), Roueche and Snow (1977), and Bloom (1971), the following recommendations were made to the mathematics faculty, Dean of Student Services, and the Vice-President of Instructional Services at Malcolm X College:

1. The study should be reviewed, discussed, and evaluated by the mathematics department to determine methods for improving the design and evaluation of the course. Based on

the findings of Alvord (1972), the design should address both cognitive and affective goals.

2. A standing committee should be formed to discuss methods for improving the attitudes of students enrolled in mathematics courses.

3. The study should serve as a catalyst for exploring the possibility that holistic instruction may be a more effective method to teach mathematics.

In conclusion, if attending Malcolm X College is to be a meaningful educational experience for students, especially the academically disadvantaged, an effective, caring, well-informed, and capable teaching staff is essential. Since a number of students enroll in the college with negative attitudes toward instruction, it is the responsibility of the college to assist these students in developing the basic skills and attitudes needed to facilitate their academic and personal growth.

The college is accountable for student learning and development. The faculty and administrators must be concerned with developing innovative strategies to improve instruction and student attitudes. The college cannot totally depend on the university to develop effective models for learning. Instructors must design, implement, and evaluate nontraditional

activities to facilitate student learning. They must make every effort possible to ensure that the "open door" is not a "revolving door" for students. They must believe that students can learn if given time and direction. Finally, instructors must believe that they are accountable for student learning and development and that the concept of accountability is not "empty rhetoric."

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APPENDIX

QUESTIONNAIRE

Directions: Below are several statements about the period of instruction which you have just completed. Read each statement carefully and indicate how much you agree or disagree with it according to the following scale:

SD=strongly disagree D=disagree N=neutral
SA=strongly agree A=agree

1.	I would like more instruction presented this way.	SD	D	N	A	SA
2.	This instruction was very boring.	SD	D	N	A	SA
3.	The material presented was of much value to me.	SD	D	N	A	SA
4.	The instruction was too specific.	SD	D	N	A	SA
5.	I was glad just to get through the material.	SD	D	N	A	SA
6.	The material presented will help me to solve problems.	SD	D	N	A	SA
7.	I can apply very little of the material which I learned to a practical situation.	SD	D	N	A	SA
8.	The material made me feel at ease.	SD	D	N	A	SA
9.	In view of the time allowed for learning, I felt that too much material was presented.	SD	D	N	A	SA
10.	I could pass an examination over the material which was presented.	SD	D	N	A	SA
11.	I became easily discouraged with this type of instruction.	SD	D	N	A	SA
12.	I was not sure how much I learned while taking this instruction.	SD	D	N	A	SA
13.	There are too many distractions with this method of instruction.	SD	D	N	A	SA
14.	The material which I learned will help me when I take more instruction in this area.	SD	D	N	A	SA
15.	This instructional method did not seem to be any more valuable than regular classroom instruction.	SD	D	N	A	SA

16.	I felt that I wanted to do my best work while taking this instruction.	SD D N A SA
17.	This method of instruction makes learning too mechanical.	SD D N A SA
18.	The instruction has increased my ability to work.	SD D N A SA
19.	I had difficulty reading the written material that was used.	SD D N A SA
20.	I felt frustrated by the instructional situation.	SD D N A SA
21.	This is a poor way for me to learn skills.	SD D N A SA
22.	This method of instruction does not seem to be any better than other methods of instruction.	SD D N A SA
23.	I am interested in trying to find out more about the subject matter.	SD D N A SA
24.	It was hard for me to follow the order of this instruction.	SD D N A SA
25.	While taking this instruction I felt isolated and alone.	SD D N A SA
26.	I felt uncertain as to my performance in the instruction.	SD D N A SA
27.	There was enough time to learn the material that was presented.	SD D N A SA
28.	I don't like this instruction any better than other kinds I have had.	SD D N A SA
29.	The material presented was difficult to understand.	SD D N A SA
30.	This was a very good way to learn the material.	SD D N A SA
31.	I felt very uneasy while taking this instruction.	SD D N A SA
32.	The material presented seemed to fit well with my previous knowledge of the subject.	SD D N A SA
33.	This method of instruction was a poor use of my time.	SD D N A SA
34.	While taking this instruction I felt challenged to do my best work.	SD D N A SA

35.	I disliked the way that I was instructed.	SD	D	N	A	SA
36.	The instruction gave me facts and not just talk.	SD	D	N	A	SA
37.	I guessed at most of the answers to problems.	SD	D	N	A	SA
38.	Answers were given to the questions that I had about the material.	SD	D	N	A	SA
39.	I seemed to learn very slowly with this type of instruction.	SD	D	N	A	SA
40.	This type of instruction makes me want to work harder.	SD	D	N	A	SA
41.	I did not understand the material that I was presented.	SD	D	N	A	SA
42.	I felt as if I had my own teacher while taking this instruction.	SD	D	N	A	SA
43.	I felt that no one really cared whether I worked or not.	SD	D	N	A	SA

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